

# Aspen Leafminer

## Serpentine mines impart silvery hue

**Name and Description**—*Phyllocnistis populiella* Chambers [Lepidoptera: Gracillariidae]

Adult aspen leafminers are tiny moths with a wingspan of about 1/4 inch (6 mm); narrow, lance-shaped, white wings mottled with brown and black markings; and relatively long, thread-like antennae. Moths have an unusual resting posture of standing tall on their front legs with their bodies slanted downward with the tips of their hair-fringed wings resting on the surface behind. Larvae are a pale, yellowish white color; very flat; and 1/10-1/4 inch (3-6 mm) long when mature. They develop internally in serpentine tunnels they create within aspen leaves (fig. 1). Dark-colored pupae are found within the larval mine. Aspen leafminer is a transcontinental species that apparently can be found everywhere aspen occurs across the western United States.

**Host**—Aspen; similar mines are found on cottonwood, poplar, and willow but are probably caused by other species

**Life Cycle**—Aspen leafminer has one generation per year. In early spring, more or less concurrent with aspen leaf flushing, moths emerge from hibernation and feed for several weeks on nectar produced by glands near the base of young aspen leaves. After mating, single eggs are deposited on the edge of newly opened aspen leaves, and the female then folds the leaf edge over to form a protective shelter for her eggs until they hatch. When populations are low, one or two eggs are laid per leaf, but more will be deposited per leaf during outbreaks. Hatching larvae cut through the bottom of the egg directly into the leaf and begin feeding. They spend their immature life inside this leaf, creating a meandering or serpentine mine that has a center line composed of excrement. Larvae feed with sickle-shaped jaws on the tissue between the two leaf surfaces without breaking the leaf cuticle. The last larval stage does not feed. Pupation occurs inside the mine within a silken cell the larva constructs. New adults emerge in late summer before or during leaf senescence and are active for several weeks. In the fall, adult moths locate protected sites to overwinter. Other species of moths and flies also mine aspen leaves but do not create the characteristic mines and pupate within them.

**Damage**—Mining of leaf tissue causes the leaves to dry out and turn brown, which may lead to premature leaf drop, especially in severe infestations. Large populations render a silvery hue to the appearance of aspen stands viewed from a distance (fig. 2). Periodic epidemics occur in Wyoming, and sustained outbreaks that cover up to half a million acres in 1 year have occurred several times in Alaska. During outbreaks, moths seeking overwintering shelter can become a minor nuisance by entering homes. Damage due to aspen leafminer feeding is described as being primarily cosmetic. However, heavily mined leaves have been shown to lose much of their photosynthetic capacity, which may reduce aspen tree growth. Sustained aspen leafminer outbreaks are suspected to cause branch dieback and top-kill, but this has not yet been proven. Similar leaf mining damage, in the shape of irregular blotches, can be caused by the larvae of the poplar blackmine beetle, *Zeugophora scutellaris* Suffrian.

**Management**—As with many leaf mining insects, natural enemies, including diseases, parasites, and predators, are the main causes for collapsing outbreak populations of aspen leafminer. Cannibalism can also occur in dense populations with many larval mines per leaf. It is also suspected that climate is influential in determining aspen leafminer populations.

Aspen can tolerate significant defoliation. The fact that outbreaks collapse on their own, combined with a lack of evidence indicating economic damage, means that there is little need for active management of aspen leafminer populations. In addition, there are no effective control measures for large-scale outbreaks. Keeping trees in good



Figure 1. Characteristic serpentine leaf mine with central line made by larva of *Phyllocnistis populiella* on quaking aspen. Photo: William M. Ciesla, Forest Health Management International, Bugwood.org.

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health helps reduce the impacts of insect pests in general. Contact insecticides are not effective against leafmining insects during their most damaging stage because they are protected inside the leaf. Some insecticides that are carried systemically through the tree can be effective in controlling leaf mining insects.



Figure 2. Aspen showing the silvery hue indicative of a dense population of aspen leaf miner.

*Photo: Intermountain Region, Ogden Archive, USDA Forest Service, Bugwood.org.*

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